Claim 3 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Anderson et al. in view of Milbrandt (USP 4,631,548); Claim 5 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Anderson et al. in view of Jacobs et al. (USP 4,705,675); Claims 8 and 30 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Anderson et al. in view of Nagoshi et al. (USP 6,224,182) and Jacobs et al.; and Claims 10-12, 32 and 40-42 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Anderson et al. in view of Arthur et al. (USP 5,049,898).

For the reasons set forth below, Applicant respectfully traverses the rejections and requests favorable disposition of the application.

Argument

As previously argued, for example in the Amendment filed on March 30, 2004, Anderson at least fails to disclose that a plurality of ink drop ejections are executed "***while varying an ejecting time duration***... to measure ***either*** corresponding ejected amounts of ink droplets ***or*** corresponding ejected speeds", as claimed. Based on the disclosure in Anderson that any one or more of the characteristics, which include nozzle heater resistance, drop mass and drop velocity, may be used (Abstract), and that a plurality of ink droplets are ejected to determine the mass of a single ink droplet (Col. 4, Line 66 - Col. 5, Line 14), the Examiner contends that Anderson teaches the claimed alternative measurements, i.e., ejected amounts or ejected speeds of ink. Incidentally, the Examiner seems to associate the plural form of certain expressions, such as, pulse widths and pulse width values in Figs. 3 and 4 of Anderson, with the claimed ejecting conditions (see Page 3 of the Office Action).

In response, Applicant submits that it is incorrect to associate the plural form of the *pulse width* and *pulse width value* expressions with the claimed (plural) ejecting conditions. Since the object to which the evaluation pulse in Anderson is provided is expressed as the plural form, the evaluation pulse and the width thereof are also expressed in the plural form, accordingly. (See Col. 3, Lines 63-65; … to determine nominal widths of the pulses which should be provided to the heaters…) (see also Col. 4, Lines 1-3; … the pulses which should be provided to … or individual heaters.) The concept disclosed in Anderson is applicable to a case where a head comprises a single nozzle and a single heater (i.e., pressure generating element). For simplicity, the following discussion will be based on such a case.

In Anderson, the heater resistance is first measured. (See, e.g., Col. 4, Lines 16-19, "… a fixed voltage can be applied while selectively enabling sections of the array one section at a time and measuring current when a drop or drops are ejected from each section". Although it seems that plural measurements are not executed based on the former portion of the above description, Anderson does disclose at Col. 4, Lines 7-10, on the other hand, that "[t]he nominal pulse widths … typically vary from 0.5 microseconds to 2.5 microseconds". Since the latter portion of the above description allows for plural ink ejections, it may be interpreted that the plural measurements are executed while varying the ejecting time duration only for the case of the heater resistance measurement.

However, in a case where either the ejected amounts (mass) or the ejected speeds of the ink droplets are measured, as claimed, the above discussion is not applicable. For example, at Col. 4, Lines 54-56, Anderson discloses, "[o]nce the resistance adjustments have been made, the

electrical process variations are no longer variable in consistency of drop production".

Accordingly, Applicant submits the "electrical process variations" are directed to the pulse widths of the evaluation pulses. In the mass measurement, a plurality of ink ejections are performed as described above. Clearly an exact single mass of an ink droplet cannot be obtained if the ejecting time duration is varied during the measurement (plural ink ejections).

The concept in Anderson can be summarized as follows. For each of the heaters and for any one or more of the characteristics including the heater resistance, drop mass and drop velocity, an offset from a design value is identified under a certain ejecting condition, and then a drive signal is modified so as to compensate for the offset in order to optimize the operation of each heater. Although the plural form expression "pulse widths" is used in the step 168 or later in Fig. 3 of Anderson, the ejecting time duration (ejecting condition) is not varied. Rather, since the first measurement (heater resistance) is performed with respect to plural heaters, different pulse widths are set to compensate different offset values which are obtained by the first measurement. Actually, in the step 160 showing the ejection condition of the first measurement, the single form expression "pulse width" is used. In any event, for each of the nozzles or the heaters, Anderson's ejecting condition must be constant when the ejecting amounts or the ejection speeds are measured. Therefore, Applicant submits that Anderson fails to satisfy the claimed requirement in this regard.

That is, Anderson does not disclose "executing a plurality of ink droplet ejections from the nozzle orifice, while varying an ejecting time duration as ejecting conditions to measure either corresponding ejected amounts of ink droplets or corresponding ejected speeds as ejecting

results", "identifying a correlation between the ejecting conditions and the ejecting results based on the plurality of ink droplet ejections" and "classifying the assembled recording head into a plurality of ranks, based on the identified correlation", as claimed. To the contrary, consistent with the discussion above, Anderson discloses ejecting ink from a nozzle orifice at a fixed ejecting time duration, identifying an offset between the ejecting result and a designed value and modifying the ejecting time duration to compensate the identified offset to optimize the ink ejection.

Further, in accordance with the claimed invention, a plurality of ink ejections (measurements) are executed with respect to each of the pressure generating elements to measure either the ejecting amounts or the ejecting speeds, while varying the ejecting time duration. Accordingly, a correlation (or trend) between different ejecting conditions and corresponding ejecting results, e.g., as shown in Fig. 6, is obtained. The trend is subsequently used to classify, or rank, the recording heads. Applicant respectfully submits that "ranking", as claimed, is clearly distinguishable from "optimizing" as disclosed in Anderson. The "optimization" in Anderson is directed to a single unique state, whereas "ranking" allows for the consideration of a plurality of states, as shown, for example, in Fig. 7 of the present application. In accordance with the present invention, the same control condition can be applied to different controlled objects if the objects are classified into the same rank. The ranking concept as claimed is much more economical than the Anderson concept of optimization because, in accordance with control based on optimization, a unique control condition must be provided with respect to each of the

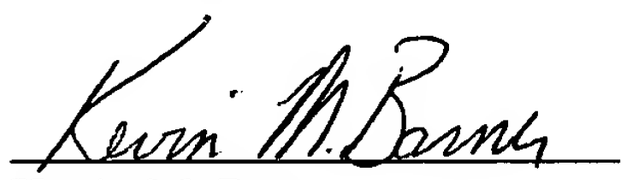
controlled objects. For this additional reason Applicant submits that Anderson discloses a different concept than the concept claimed.

Conclusion

In view of the foregoing remarks, the application is believed to be in form for immediate allowance with claims **1-44**, and such action is hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, he is kindly requested to **contact the undersigned** at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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